Proposing an Interprofessional Competency Framework for Person-Centered Care Connecting Interprofessional Education and Collaborative Practice

HIP&E

ORIGINAL RESEARCH

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ABSTRACT

Introduction: The number of complex healthcare problems is increasing, the workforce is diminishing, and healthcare costs are rising. Interprofessional Education and Collaborative Practice is a promising solution, necessitating the cultivation of skills and competencies among health and social care professionals. The central question guiding this study revolves around the possibility of merging interprofessional collaboration, lifelong learning, the International Classification of Functioning, Disability and Health (ICF), and the Rehabilitation Competency Framework (RCF) into a unified competency framework that can be used in both education and in the work field.

Method: In total, five modified Delphi rounds were executed during three phases specifically comprising the design, relevance, and report stages. The first contains a literature search, the second includes 11 pilots with surveys, and the last finalized the INPRO Competency Framework (INPRO CF).

Results: The primary result is the INPRO CF that is readable, accurate, applicable, and accepted. It contains five domains, 17 competencies, and 200 learning outcomes or behaviors. It exists in four languages (Dutch, Finnish, English, German).

Discussion: The INPRO CF is a relevant interprofessional competency framework designed to alleviate deficiencies between education and practice so it is suitable for a lifelong learning process. It demonstrates adaptability across various contexts.

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IMPLICATIONS FOR PRACTICE

1. The INPRO Competency Framework provides a structured overview of the learning journey in becoming an experienced interprofessional collaborator and is applicable in both practice and educational settings.
2. The INPRO Competency Framework provides a comprehensive understanding of goals that an individual in a team can work on and structures those that it would like to achieve.
3. The INPRO Competency Framework has the potential to positively impact person centered care by promoting collaboration among health and social care professionals. It simultaneously can contributes to transforming education by shaping curricula and preparing students for interprofessional teamwork in their future careers.

INTRODUCTION

The number of aging and chronically ill individuals with decreasing functioning is rapidly increasing. Correspondingly, complex healthcare is increasing, the workforce is diminishing, and healthcare costs are steadily increasing. Interprofessional Education and Collaborative Practice (IPECP) is a promising solution for enhancing care and population health as well as reducing the length of hospital or rehabilitation stays by improving interprofessional and person-centered collaboration among health and social care professionals (Gilbert et al., 2013; Martin et al., 2010). According to the Centre for the Advancement of Interprofessional Education (CAIPE), interprofessional education is the occasion when two or more professions learn from, with, and about each other in order to improve collaboration and the quality of care. Interprofessional collaboration synchronizes multiple services for achieving joint outcomes. The IPECP requires the skills and competencies of professionals, and a robust competency framework can shape the learning outcomes of education for both students and professionals and also ensure that the knowledge and skills that are taught are in accordance with the needs. Several studies indicate that utilizing an interprofessional competency framework can have an indirect positive impact on patient care, healthcare team collaboration, and healthcare professionals' job satisfaction (Reeves et al., 2017; D'Amour et al., 2005; Hall et al., 2018). Therefore, it is a crucial tool for aligning the workforce with population needs by supporting competency-based students and professional education as well as regulatory standards (World Health Organization, 2020b).

In 2020, the World Health Organization (WHO) published the validated Rehabilitation Competency Framework (RCF) (World Health Organization, 2020b) that can be used by students and professionals alike. The RCF has wide-ranging applicability across distinct health and social care disciplines, specializations, and settings. Its distinctive strength lies in harmonizing rehabilitation competencies, encompassing the wide spectrum of rehabilitation activities, establishing a common language, and maintaining relevance in both resource-rich and resource-poor contexts. Rehabilitation professionals are described as professionals in the field of health and social care. The development of this framework is considered a crucial measure toward enhancing workforce capability, improving care quality, and establishing a unified rehabilitation workforce identity (Mills et al., 2021).

The RCF was created to simplify the development of competency frameworks tailored to specific contexts while ensuring alignment with other frameworks in the rehabilitation domain. This is achieved primarily by facilitating the development of context-specific competency frameworks through an "adopt and adapt" approach. Developers can adopt the RCF's structure and language and adapt the content according to their situation and needs (World Health Organization, 2020a).

In existing literature, most competency frameworks related to the IPECP are typically assumed to be used either in an educational or a practical context. The dichotomy between student education and the practical context appears illogical since individuals continuously acquire competencies throughout life that extend beyond formal learning (Reinders & Pype, 2023). This lifelong learning is driven by personal, professional, and social development goals (Sockalingam, 2022; Gonnella, 2022; Fluit, 2021) It acknowledges that learning is not confined to a specific time or place but is a continuous journey of growth and fulfillment from the first day of the study until the end of one's career. Key aspects include flexible learning pathways

and self-directedness for which the latter provides flexibility, autonomy, and ownership and also enables learners to focus on topics personally meaningful or relevant to their interest. As students' and professionals' education differ between countries, the same competency framework allows both to evaluate their abilities and can stimulate self-directed learning and therewith interprofessional collaboration (Reinders & Pype, 2023).

Interprofessional competencies learned during interprofessional education should be aligned with interprofessional competencies applied in practice. A framework that describes interprofessional development in the same sequence in education as well as practice is required. For this purpose the Meta-Model of Interprofessional development is created. The Meta-Model of Interprofessional Development is a comprehensive guide for enhancing interprofessional collaboration across various contexts and purposes. It integrates perspectives from interprofessional practice, education, and research and offers operational and strategic dimensions linked to developmental phases. These dimensions interact and influence each other and impact practice, education, and research. The model emphasizes the teachability, verifiability, and practicability of interprofessional priorities that include negotiating professional identity, shared problem-solving, interprofessional planning, and interprofessional identity formation. It highlights the complexities of interprofessional collaboration and addresses challenges such as professional and interprofessional collaboration and addresses challenges such as professional and interprofessional identity formation, network development, and systemic influences. The meta-model ultimately aims to assist students, educators, practitioners, and researchers in navigating the intricacies of interprofessional collaboration. Therefore, it is specifically designed to enable the transfer of learning into practice and align both (Reinders & Pesut, 2022).

A shared language and conceptual framework are crucial for successful interprofessional collaboration (Allan et al., 2006). The International Classification of Functioning, Disability and Health (ICF) describes a framework for such a shared language on functioning (World Health Organization, 2001). Students and professional educators are increasingly focusing on applying the ICF as a learning framework to scaffold the IPECP (Snyman et al., 2015). Utilizing the ICF in curricula and formulating training goals provides opportunities to align education with IPECP competencies (Moran et al., 2020). It has the potential to transform the education of health and social care professionals, including students, and to improve interprofessional collaboration. (Geertzen et al., 2011; Allan et al., 2006). This process can contribute to strengthening health and social care systems and individuals' health status (World Health Organization, 2013)

Although there is a significant amount of attention paid to the IPECP, there is a disparity between the competency levels of future professionals and the levels necessary in rehabilitation practice (World Health Organization, 2010). Educational institutions and employers can adopt a common competency framework (CF) to ensure quality. It guarantees that learners are acquiring the required skills and knowledge for their respective disciplines thereby enhancing the overall quality of both education and practice. (Bryce et al., 2000; Longworth & Davies, 1996)

The objective of the present study is to develop a relevant interprofessional CF for the lifelong learner specifically designed for an interprofessional perspective in health and social care. If this tool is used consistently from the beginning of the didactic education through their clinical career, it would help facilitate the transition and provide tools for lifelong learning.

To the authors' knowledge, no existing interprofessional CF currently exists that spans from the beginning of one's studies to the end of one's career.

The research question of this study is: Can interprofessional, lifelong learner, ICF, and RCF be combined into one competency framework that is relevant in both education and the work field?

METHODS

OBJECTIVE AND STUDY DESIGN

A mixed-method study was conducted with the objective of developing the INPRO CF that is relevant for educational and practice settings in health and social care from an interprofessional perspective. The iterative development process of the INPRO CF first included the design phase; second the relevance phase; and, third, the report phase. The modified Delphi method was used in all of the stages, that took place from March 2021 to July 2023. In this study, the expressions of competencies will be operationalized for the end user through learning outcomes and refined descriptions of specific behaviors.

DELPHI METHOD

The Delphi technique is a series of sequential questionnaires or 'rounds' interspersed by controlled feedback that seek to gain the most reliable consensus of opinion of a group of experts. The Delphi's use as a tool for resolving issues in health and social care settings is well recognized (Fink et al., 1984), and Delphi rounds are often effective for developing CFs and are widely employed in the health sector and beyond. (Davis R., 2008). A modified Delphi method involves

an in-person meeting of participants, and it was employed in this study with online meetings to reach consensus on the INPRO CF. The latter was refined to five rounds of structured feedback. An 11-member Delphi panel and two first authors(CDW and IA) were chosen to provide comments and engage in discussions regarding the description of the INPRO CF and its potential adaptations. Snowball sampling was used as the recruitment technique. Inclusion criteria of a Delphi panel member were expertise in interprofessional education or work field and being employed by one of the seven consortium organizations of the INPRO project (AP UAS, Coronaria, Fachhochschule Sankt Pölten, HANZE UAS, Moorheilbad Harbach, JAMK UAS, Revalidatie Friesland). Participants were required to be a lecturer or professional in the health or social care domain and have knowledge about competencies as well as being able to be present from the five rounds. The Delphi rounds were performed respectively:

- Three weeks before the meeting, participants received information about the study with an exploratory email in accordance with the ethical guidelines.
- After confirmation, at least one week before the meeting, the results and discussion topics were remitted by email.
- During each meeting, the panel member expressed the subject of that Delphi round. After a 50–100 minutes of discussion, the Delphi members were asked for their final opinion.
- The Delphi rounds were conducted until 80% consensus was attained.

1. DESIGN PHASE

Figure 1 provides an overview of the design phase. The RCF is the master framework and therefore the starting point in this stage. After defining and reaching agreement on an overall definition of interprofessional competencies (1ste Delphi round), competencies that are formulated in selected interprofessional frameworks were added to the original RCF and discussed in the 2nd Delphi round. The objective of the 3rd Delphi round was to reach consensus on adapting the competencies into four levels: knows (level 0), knows how (level 1), shows (level 2), and does (level 3).

DEFINITION INTERPROFESSIONAL COMPETENCIES:

In preparation of the first consensus meeting, an overview from literature definitions of interprofessional competencies was gathered by a part of the expert group (CDW, IA, JJR). This was subsequently presented to the Delphi panel members through email and, included a suggestion for an overall definition. During round 1 of the Delphi, all comments were presented to the panel with the objective of reaching consensus on one definition.

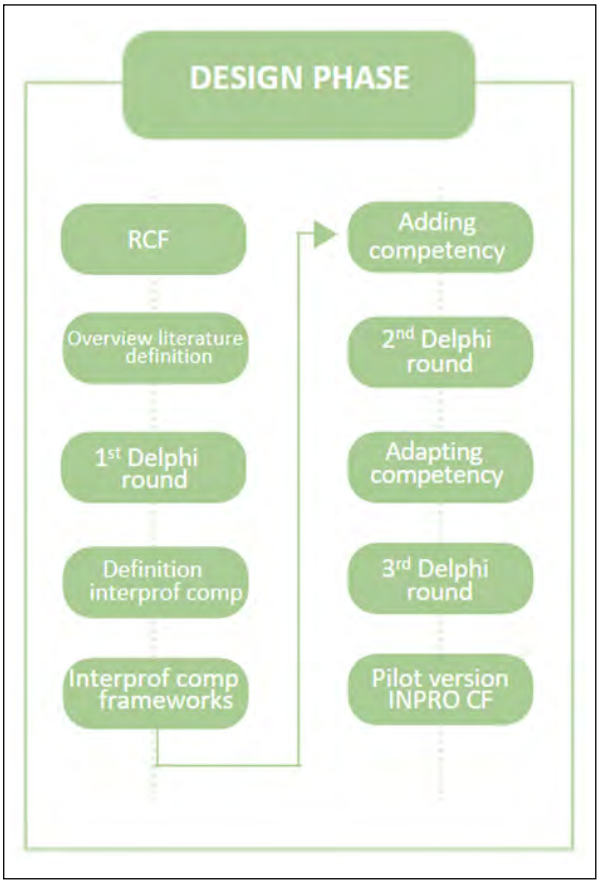

Figure 1 Design phase.
Interprof comp, Interprofessional competencies.
RCF, Rehab.

Selecting interprofessional competency frameworks (first round)

The literature search was performed in the databases of PubMed, Web of Science, and Cochrane Controlled Trials Register. It contained the search terms “interprofessional competency framework,” combined with “health”, “healthcare”, “social care”, and ”ICF”. The literature was independently searched by the first two authors (CDW, IA).

The inclusion of a framework was determined on the following criteria:

- Focus of the framework: Frameworks are conducted within the context of interprofessional competencies in health and social care.
- Field of framework: The frameworks are conducted within health and social care. Frameworks describe interprofessional competencies of a student or health and/or social care professional.

- Quality criteria: Frameworks are validated and reliable.
- Language: For transparency and comprehension reasons, only frameworks written in English were included. The reason for including competencies of other frameworks was to be as complete as possible in order to cover the relevance for the education- and work field setting.

All project group members of the INPRO project were asked for completeness of the list of frameworks and their opinion on validity and reliability.

PROCEDURE FOR ADDING AND ADAPTING INTERPROFESSIONAL COMPETENCIES (2ND AND 3RD DELPHI ROUND)

Adding a competency

The competencies described in the selected CFs were extracted and linked to the RCF master framework if they conveyed new or clearer meanings by CDW and IA. The 2nd Delphi round took place to discuss and reach consensus on the linked additional competencies. The Delphi panel was asked to agree on whether to include the competency based on the criterion: "Does this competency discriminate from the original RCF competency? Additionally, it needed to decide the relevance of the original RCF competency and the need for adaptation.

Adapting a competency

In preparation of the third round, the competencies and descriptions of the RCF were adapted in accordance with the guideline outlined in "adapting the RCF for a Specific Context" by CDW and IA (World Health Organization, 2020a). To give the end user insight into an increasing level of autonomy, decision-making ability, and depth of knowledge and skills, the existing levels of the RCF were adopted and adapted. A classification into levels was used that adhered to the Miller and Bloom's taxonomy; Knows (level 0), knows how (level 1), shows (level 2), and does (level 3) (Miller, 1990). To express these levels, Bloom's taxonomy verbs were used formulating the learning outcomes or behaviors (Bloom, 1956). The levels of the RCF were adapted, and the levels of descriptions for the included learning outcomes or behaviors of other frameworks were retained and appended to the corresponding level. CDW and IA created a preliminary version of the INPRO CF to be discussed during the 3rd Delphi round.

2. RELEVANCE PHASE

Relevance is defined by the WHO as readability, accuracy, applicability, and acceptability (World Health Organization, 2020a). This was explored in 11 pilots. To enable a shared language and understanding between end uses and to align education with the IPECP learning outcomes, in this phase, the ICF described learning outcomes were linked with the concept of competency framework. To improve the relevance, translations were performed to four languages (Figure 2).

To ensure the relevance of the INPRO CF, professionals and lecturers were included as panel members in all rounds. In the relevance phase, all end users (professionals, lecturers, students, and managers) were included which allowed perspectives and feedback to be gathered to improve the INPRO CF.

It was tested throughout 11 pilots conducted in four countries (Figure 2). Two were in Belgium (one internship and one in the work field); three in Finland (one in a higher education institution (HEI), one in the work field, and one in a common internship); three in Austria (one in an HEI, one common internship and one in the work field); and three in the Netherlands (one in an HEI, one in the work field, and one in a common internship).

Based upon the objective of the pilot, the data collection for them involved multiple evaluation methods from professionals, lecturers, students, and managers. A specific selection out of all of the competencies was made independently by two persons from the participating

Figure 2 Relevance phase.
HEI, Higher Educational Institution.

organization. Consensus was reached about which of the competencies could be achieved during their specific project. The evaluation questionnaire for the INPRO CF was derived from WHO's Annex 4 (World Health Organization, 2020a). That was used as the basis for feedback form or to inform of the content of a feedback survey. This form uses a Likert scale and free text fields to gather a combination of quantitative and qualitative feedback. It is customized to accord with the purpose of the INPRO CF (Appendix 1). A shortened version of the questionnaire was developed in a google form format to accommodate time constraints.

- Quantitative data
  - Long form questionnaire consists of 16 questions in four domains (accuracy, readability, applicability, acceptability) scored on a 5-point Likert scale for which 1 indicated "strongly disagree to 5 "strongly agree". It is intended to be used by end users with more knowledge about competencies.
  - Short form questionnaire consists of three questions in two domains (accuracy and readability) scored on a 5-point Likert scale where 1 indicated "strongly disagree to 5 "strongly agree" and can be used by all end users.
- Qualitative data
  - Long form open-ended questionnaire allowing end users to provide detailed, free-form responses. To be used by end users with more knowledge about competencies.
  - Short form open-ended questionnaire to be used by all end users.

To ensure integrity, the authors and panel members were not involved in the data analysis of the closed ended responses of the long and short questionnaires.

INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY, AND HEALTH (ICF)

The 4th Delphi round focused on incorporating the ICF competencies into the INPRO CF, particularly under the leadership of Belgian and Finnish researchers. It is mentioned that the ICF framework can provide a guide for developing both public competencies (World Health Organization 2013, 47) and clinical competencies (World Health Organization 2013, 50), however, a literature search did not reveal any published for the ICF. However, the learning outcomes of ICF education are presented, therefore, the researchers referenced existing education literature and their own expertise in applying the ICF framework to person-centered interprofessional collaboration. The key point of ICF competencies was that ICF provides a beneficial framework for structuring a person-centered functioning assessment, clinical reasoning, and treatment for all of those involved in person's rehabilitation (World Health Organization 2013, 50).

TRANSLATIONS

Translations of the INPRO CF were conducted in Dutch, German, and Finnish. Linguistic experts, both internal and external, and members of the Delphi panel used a forward-backward translation process that permitted multiple individuals to comprehensively examine the competencies and descriptions of learning outcomes or behaviors. Their feedback was incorporated in the 5th Delphi round.

3. REPORT PHASE

Figure 3 provides an overview of the report phase.

ANALYSIS

Data from the questionnaires was entered in Microsoft Excel for analysis. Boxplots of scores were constructed to give the reader a visualization and insightful information regarding the distribution (shape, variability, and center).

The outcome of the analysis of the qualitative and quantitative data were discussed during the 5th Delphi round with the panel. Final modifications were made to the INPRO CF based on the insights that were gained.

Figure 3 Report phase.

ETHICS

Ethics Approval and Consent to Participate Since respondents to the survey were not subject to procedures or required to follow rules of behavior, the study was not subject to the Dutch law Medical Research Involving Human Subjects Act (WMO), and therefore, approval by a Medical Ethical Committee was not required. This study was conducted according to the Helsinki Declarations. Participants were informed about the nature of this study by an introduction attached to the online survey, and were asked to participate anonymously, i.e., survey links were anonymous. Informed consent was obtained from all respondents before completion of the survey. The answers to all questions were irreducible to personal identities.

RESULTS

DELPHI

Demographic information about the Delphi panel and the two first authors (CDW and IA) ranging in age from 27 to 62 years are presented in Table 1.

The Delphi process was completed as described in the method section. A consensus of 100% was achieved in the last Delphi round for each competency, learning outcome, and behavior description.

1. DESIGN PHASE

DEFINITION INTERPROFESSIONAL COMPETENCIES

Four definitions of interprofessional competencies were ascertained in literature (World Health Organization, 2020b; Interprofessional Education Collaborative, 2016; Shavelson, 2010; Kouwenhoven, 2009) and commented on, by the Delphi members during the 1st Delphi round. Consensus of 100% was reached on the following definition:

> *Interprofessional competencies are the observable abilities of a learner, integrating knowledge, skills, values and attitudes that enable working together successfully across the professions and with a person and their family to improve health outcomes in specific care contexts. Competencies are durable, trainable and, through the expression of learning outcomes, measurable. Personal characteristics such as motivation, self-confidence, willpower and flexibility are part of a certain context.*

DEMOGRAPHIC	CATEGORY	N (13)
Gender	Women (n)	11
	Men (n)	2
Country	Austria	2
	Belgium	2
	Finland	4
	The Netherlands	5
Profession	Dietitian	2
	Occupational therapist	1
	Physiotherapist	6
	Psychologist	1
	Speech therapist	3
Workplace	HEI	8
	Clinical practice	3
	HEI/clinical practice	2

Table 1 Demographic information about the members in the Delphi rounds (n = 13).

HEI, Higher Educational Institution.

Selecting interprofessional competency frameworks

The literature search resulted in the inclusion of five relevant interprofessional competency frameworks shown in Table 2. During 1st Delphi round, members agreed that the table is complete, and all five frameworks are valid and reliable.

ADDING AND ADAPTING COMPETENCIES 2ND AND 3RD DELPHI ROUND

The INPRO CF underwent adaptation in each Delphi round through feedback and optimization efforts. Insight into the entire process can be requested from the first author.

Table 3 provides an overview of the differences and similarities between the RCF and the concept INPRO CF at the end of the design phase.

The concept INPRO CF comprises five domains, specifically Interprofessional Practice, Interprofessionalism, Learning and Development, Management and Leadership, and Research (Figure 4). It encompassed 17 competencies and 200 Learning outcomes or behaviors. The glossary used as the foundation for terminology was derived from the WHO. (INPRO – Interprofessionalism in action (inproproject.eu))

2. RELEVANCE PHASE

The 11 pilots were employed with a diverse range of participating managers, lecturers, students, and professionals.

The 11 projects had a unique context that led to the selection and evaluation of distinct competencies of the INPRO CF (Appendix 2). Throughout the pilots, the entire INPRO CF was assessed covering all competencies (Appendix 2).

IPEC: Interprofessional Education Collaborative. Core competencies for interprofessional collaborative practice (Interprofessional Education Collaborative, 2016)
IPCIHC: Interprofessional collaboration in health care. Learning to collaborate interprofessional in healthcare (Tsakitzidis G. , 2018)
EIPEN: European interprofessional practice and education network key competencies for interprofessional practice in health and social care – version 2.1 (EIPEN, 2020)
WHO: Framework for action on interprofessional education and collaborative practice. (WHO, 2010)
IPC-IPA: The intersection of professionalism and interprofessional care (IPC): development and initial testing of the interprofessional professionalism assessment (IPA) Interprofessional Capability framework- Breewer (Frost et al., 2019)

Table 2 Five Included Interprofessional competency frameworks.

CHARACTERISTICS	RCF/INPRO CF	COMMENTS
domains	RCF (n): 5 INPRO CF (n): 5	Focus interprofessional (E.g. RCF: practice ; INPRO CF: interprofessional practice)
Competency	RCF (n): 17 INPRO CF (n): 17	Focus interprofessional (E.g. IPMC3 RCF: works professionally INPRO CF: works interprofessionally)
Learning outcomes/behaviors/ activities	RCF: behaviors/activities INPRO CF: Learning outcomes/behaviors	Reason no activities in INPRO CF: not every health and social worker will undertake all activities; which activities are required are dependent on the role and its demands. INPRO CF is in total usable for health and social care.
Level of proficiency	RCF: level 1–4 INPRO CF: level 0–3	Reason level 0: to create learning outcomes on the level of a starting students in health and social care
Core values and beliefs	RCF: 4 values, 4 beliefs INPRO CF: 5 values, 4 beliefs	INPRO CF added flexibility to the list of RCF

Table 3 Overview similarities and differences between RCF and INPRO CF with examples. RCF, rehabilitation competency framework (WHO); INPRO CF, INPRO Competency Framework; n, number.

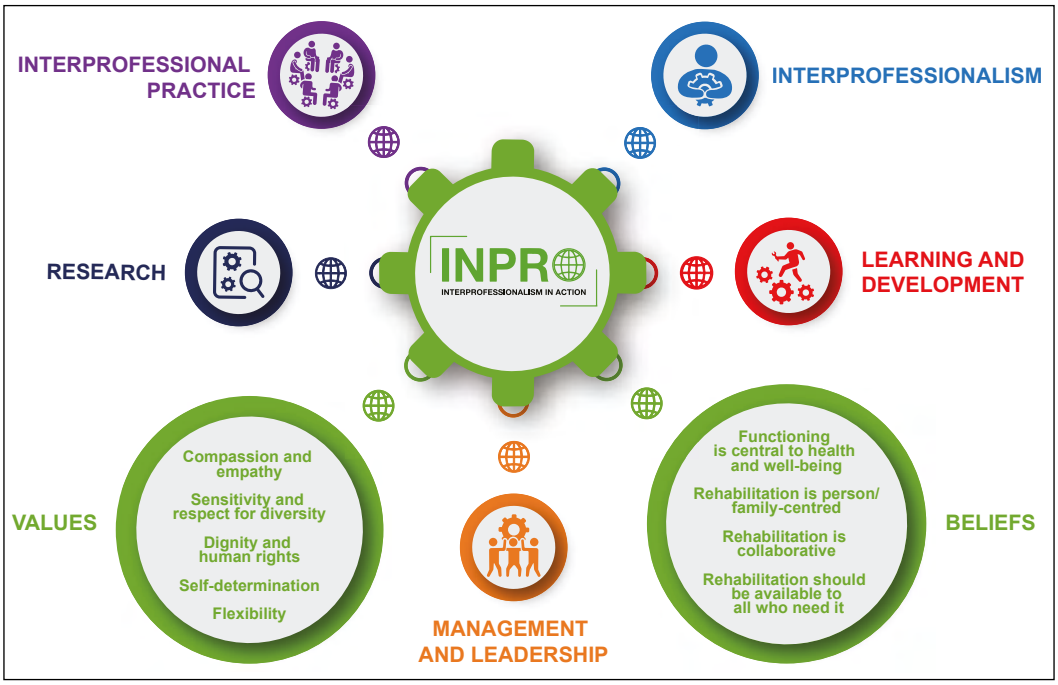

Figure 4 Overview INPRO CF adapted from WHO-RCF: domains, values and beliefs.

TRANSLATIONS

The original English edition shall be the binding and authentic edition. Translations into four languages were performed. It is imperative to note that the translation were not created by the WHO nor is it responsible for its content or accuracy.

INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY, AND HEALTH

In the 4th Delphi round, the ICF learning outcomes are added to the INPRO framework in four domains (interprofessional practice, learning and development, management and leadership, research) to the following competencies IPC1. L0c/1e/2d/3c; IPC4.L0c/1b/2c/3c; LDC1.L0c/1d/2c/3c; MLC3. L0b/1c/2c/3d/3e; RC2.L0b/1b/2b/3b. Person-centeredness was included in the domain interprofessional practice.

3. REPORT PHASE

QUANTITATIVE AND QUALITATIVE DATA

Sixteen lecturers in health and social care and two managers answered the long form questionnaire while 179 students, six professionals, two manager and one staff member answered the short form. There was a mix of health professions (see Table 4).

The findings obtained from the analysis and synthesis of the long and short forms are respectively presented in a boxplot in Figures 5 and 6.

Two authors (CDW, IA) coordinated feedback from the pilots and participated in discussions during the Delphi rounds. These fostered deliberations aimed at ascertaining the efficacy of the INPRO CF for adequately addressing the research question. During the 5th Delphi round, optimalisation of wording took place (e.g. ICF model changed in ICF Framework), changing levels (according to user's feedback and expert opinion), and changes to the lay out were made.

The INPRO CF was last modified in June 2023 with the guidance of an English expert due to the absence of native speakers during the Delphi rounds.

INPRO CF

Figure 7 gives an overview of the domains and competencies of the INPRO CF. In appendix 3, the INPRO CF can be found with learning outcomes or behaviors.

	QUESTIONNAIRE	
	LONG FORM	SHORT FORM
manager	2	2
physiotherapist	7	65
dietitian	4	37
occupational therapist	2	12
social worker	1	17
lector	1	0
nurse	1	21
applied psychology	0	3
applied sciences	0	1
doctor	0	1
rehabilitation counsellor	0	2
staff member research	0	1
profession not know	0	26

Table 4 Professions or education of the participants in the long and short form questionnaire.

DISCUSSION

The objective of the present study was to develop and validate a competency framework (INPRO CF) specifically designed for an interprofessional perspective in health and social care aiming to facilitate the transition from education to the work field. It was possible to combine interprofessional, ICF, and RCF into an INPRO CF that is relevant in both education and work field and for lifelong learners. The competencies are expressed in four levels (0–3) as specific and measurable interprofessional learning outcomes or behaviors. The pilot program aimed to develop a versatile framework applicable across diverse contexts and stages of the professional development. Rather than prescribing fixed standards, it recognizes the variability in individual, team, and cultural backgrounds; educational models; and professional paradigms. For example, the IPMC3.L1d of '*Works collaboratively with other professions to resolve conflicts that arise in the context of rehabilitation for the person and their family*' might be reached by students in interprofessional placements but not by those in solo practices. The framework serves to guide learners in their educational journey, adapting to real-world clinical needs, identifying areas for growth, and facilitating smooth transition to practice through evidence-based strategies.

Based upon the results of this study, the relevance was good in following situations; education and training, regulation, service planning, internships, and, human resource management. In all of the latter mentioned pilot situations, the competency framework was employed by the trainees and students to stimulate the self-directed

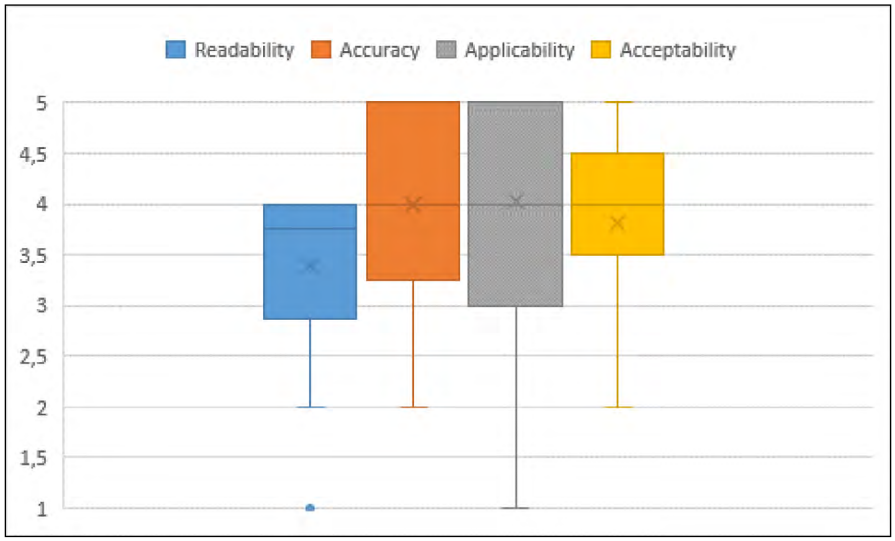

Figure 5 Boxplot of the INPRO CF Long Form survey (n = 18) by sub-categories: readability, accuracy, applicability and acceptability; *y-as: a 5-point Likert scale for which 1 indicated "strongly disagree to 5 "strongly agree".*

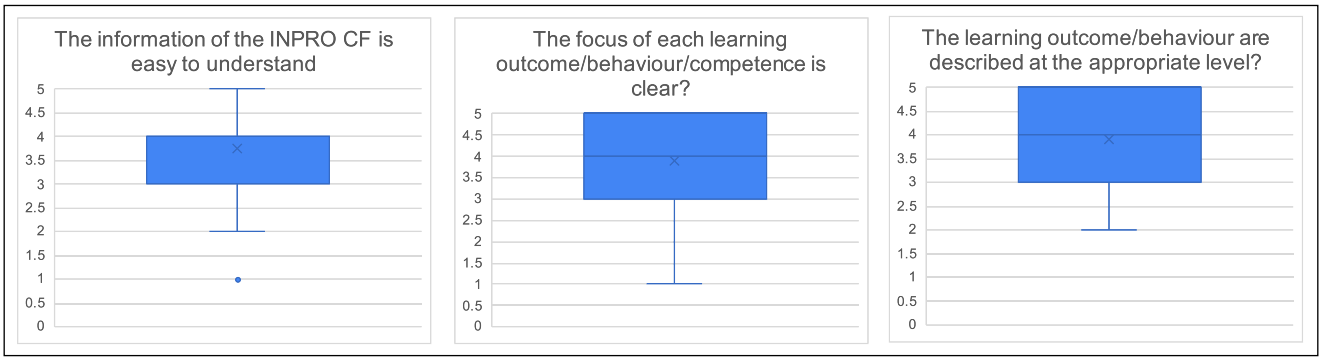

Figure 6 Boxplots of the INPRO CF Short Form surveys (n = 188) on comprehensibility; *y-as: a 5-point Likert scale for which 1 indicated "strongly disagree to 5 "strongly agree".*

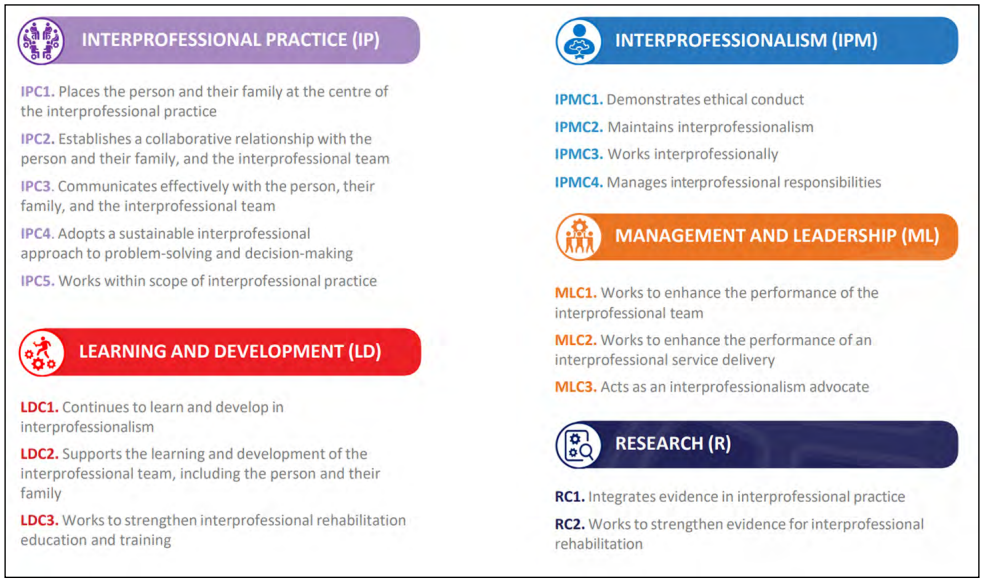

Figure 7 Summary of the INPRO Comptency Framework (INPRO CF) with the domains and competencies in English.

learning that belongs to the lifelong learning principle. It is recommended gaining more insight into the mechanisms of flexibility, autonomy, and ownership in order to measure if lifelong learning was stimulated by the INPRO CF. These approaches emphasize real-world application and performance assessment and aim to ensure that learners acquire the practical skills and knowledge needed to succeed in their chosen field. Competency-based approaches are often associated with personalized learning experiences and flexible pathways to proficiency.

These applications contribute to aligning learners to deliver interprofessional high-quality care.

The study has shown that users highly rate the INPRO CF for its readability, accuracy, applicability, and acceptability in both educational and practical settings (Figures 5–6). This work differs from previous studies in three key ways. It can be measured at all levels and in different contexts, it is also usable for lifelong learners in health and social care, and it contains ICF learning outcomes or behaviors.

The methodology employed in this study enhances the robustness of the INPRO CF. The process was iterative and relied on a combination of elements such as the Delphi method, literature reviews, a relevance phase, and translation efforts. Similar methodology was used in another study for developing a competency framework through the synthesis of literature and roundtable discussions. (O'Keefe, Henderson, & Chick, 2017).

A prerequisite for integrated care is IPE as it is the precursor to interprofessional collaboration in practice. The study of the Institute of Medicine recognized the importance of assessing multidisciplinary competencies (Institute of Medicine, 2015). IPE participants exhibited significant knowledge gains in interprofessional collaborative practice to team dynamics, team work, and tips for behavioral changed (Nagelkerk, et al., 2021; Schapmire et al., 2018). Multiple benefits of the IPECP such as improvements in practice efficiencies and facilitating community-based, holistic, and person-centered care (Nagelkerk, et al., 2021; Schapmire et al., 2018) are addressed. On an individual level, the IPE has been found to deepen the understanding of the other professionals, enhance confidence, and improve capabilities to work in integrated care settings (Bookey-Bassett, 2023; Schapmire et al., 2018).

The meta-model combines interprofessional practice, education, and research. Addressing social, organizational, and competence problems, it accentuates the importance of shared identity, role clarity, negotiation skills, and interprofessional knowledge. The model aligns with collaborative problem-solving models and emphasizes a problem-solving approach with stages like solution generation, planning, and implementation (Reinders et al., 2020; Reinders & Pesut, 2022).

Limitations of this study must be acknowledged. First, the managers, students, lectors, and professionals were actively engaged in the pilots, however there was an absence of a person and his/her family in the relevance phase. Moreover, the percentage of physiotherapists was substantial (Table 4), which may have introduced an oversampling bias on the results even though the physiotherapist and students were evenly divided between the pilots. Second, as in all questionnaires, the Hawthorne effect may have occurred (Franke & Kaul, 1978). This may consequently have resulted in a higher score. Third, since the participants in this study, work in the European health and social care system, It is uncertain whether the results are generalizable to non-European Union countries, although the pilots performed in various European HEI and work fields settings.

Future research could address a number of additional issues that were not considered during the development of the INPRO CF.

CONCLUSION

The INPRO CF is designed for an interprofessional perspective in health and social care aiming to facilitate the transition from that area of education to the work field. It was possible to combine interprofessional, ICF, and RCF into an INPRO CF that is relevant in both realms for lifelong learners. It contains five domains, 17 competencies, and 200 learning outcomes or behaviors that is described in levels. The INPRO CF is a relevant interprofessional framework that is adaptable across various contexts in health and social care in the EU. Further research is necessary to investigate how this process is facilitated and what its outcomes are on individuals and their families.

ADDITIONAL FILES

The additional files for this article can be found as follows:

- **Appendix 1.** Adapted long form survey. DOI: https://doi.org/10.61406/hipe.315.s1
- **Appendix 2.** Projects description. DOI: https://doi.org/10.61406/hipe.315.s2
- **Appendix 3.** INPRO Competency Framework. DOI: https://doi.org/10.61406/hipe.315.s3

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COMPETING INTERESTS

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AUTHOR CONTRIBUTIONS

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